Irrigation.

The subject of irrigation will be dealt with more fully in the next chapter; and it will suffice here to say that the whole district depends largely on irrigation for its crops. In the headquarters and Dinapore subdivisions the Patna-Gayá Canal, a branch of the Son canal system, supplies a considerable area. In the Bihár subdivision the landlords and cultivators maintain a large number of private irrigation works fed partly by natural drainage and partly by the rivers flowing northwards from the Gayá district. The Bárh subdivision relies almost entirely upon the floods from the Ganges and other rivers to fertilize the soil for the *rabi* crops and to supply moisture for its growth; and rice is very little grown there. Well irrigation is universal in the neighbourhood of villages, where poppy and vegetables are grown.

PRINCIPAL CROPS.

As in other parts of Bihár, the crops grown in Patna are divided into three great divisions—the *aghani*, *bhadoi* and *rabi* crops. The *aghani* consists of the winter crop of rice, which is cut in the month of Aghan (November-December), and sugarcane; the *bhadoi* is the early or autumn crop, reaped in the month of Bhádo (August-September), consisting of 60 days' rice, *maruá*, *kodo*, maize, millets and less important grains; while the *rabi* crop, which is so called because it is harvested in the spring (*rabi*), includes such cold-weather crops as gram, wheat, barley, oats and pulses. The normal acreage of the *aghani* crops is 559,000 acres or 48 per cent. of the normal net cropped area, of the *bhadoi* crops 240,000 acres (21 per cent.), and of the *rabi* crops 459,700 acres (40 per cent.). There are also 21,000 acres, or 2 per cent. of the normal net cropped area, under orchards and garden produce.

If the crops are divided into the classes usually adopted in the statistical returns, we find that out of the normal cropped area of 1,279,700 acres, cereals and pulses account for 1,318,300 acres or 90 per cent. of the whole, while oil-seeds occupy 41,900 acres or 3 per cent. The area under the remaining crops is comparatively small. Rice, of which 46 varieties are recognized, is the staple crop of the district. It is grown most extensively in the Bihár subdivision, which consists for the most part of low-lying land suitable for its cultivation. Here no less than 237,300 acres out of a total cultivated area of 376,100 acres are under rice; while the Bárh subdivision is better adapted for the cultivation of *rabi* crops and grows but little rice.

Rice.

Rice occupies a normal area of 554,300 acres, and *aghani* or winter rice forms the greater part of this crop, being raised on 538,800 acres, or 46 per cent. of the normal net cropped area. It is sown broadcast after the commencement of the rains

in June or July on lands selected for seed nurseries, which have previously been ploughed three or four times. After four or six weeks, when the young plants are about a foot high, they are generally transplanted; each plant is pulled out from the land, which is soft with standing water, and planted again in rows in flooded fields in which the soil has been puddled. The rice is then left to mature, with the aid of water, till towards the end of September. The water is then drained off and the fields are allowed to dry for 15 days, and at the end of that time they are again flooded. It is this practice, known as *nigār*, which makes the rainfall, or failing that, irrigation essential to successful harvest. These late rains (the *Hathiyā*) are the most important in the year, for not only are they required to bring the winter crops to maturity, but also to provide moisture for the sowing of the *rabi* crops. Should no rain fall at this period, or if water cannot be procured from artificial sources, the plants will wither and become only fit for fodder; but if seasonable showers fall or the crops are watered from *dhars*, *pains* or canals, the rice comes to maturity in November or December, and is then reaped. The greater portion of the rice crop is transplanted, but that on inferior lands is sown broadcast. In low-lying marshy lands sowing is commenced as early as April. When the rainfall is plentiful and the land is low enough to remain constantly under water, nothing but weeding is required. On higher lands, and in case of deficient rainfall, irrigation is necessary.

Other kinds of rice.

The *bhadoi* rice, which covers 14,200 acres, is also sown broadcast in June or July and not transplanted; it is regarded as a 60 days' crop (called *sāthi* from *sāth* sixty), and is generally harvested in August or September. There is another kind of rice, known as the *boro* or spring rice, which is sown in January, transplanted after a month and cut in April. It is grown only on marsh lands and in the beds of shallow streams, and the area (1,300 acres) cultivated with it is insignificant.

A noticeable feature of rice cultivation is the way in which it is conducted according to the lunar asterisms called *nakshatras*.* The seed-beds throughout the country are, if possible, sown within a period of 15 days, called the *Adra nakshatra* which lasts from about the 20th June to the 5th July. Transplantation

* The Hindu year is divided into 27 *nakshatras*, each representing a certain portion of the moon's path in the zodiac. The agricultural year is marked out by the position of the sun in these spaces; thus, when the cultivator says that he does anything if such and such a *nakshatra*, he means that he does so when the sun is in that particular section of the zodiac. In other words, agriculture follows the solar year.

from the seed-beds goes on during the *Punarbas*, *Pukh* and *Asres nakshatras* (18th July—15th August). The water on the fields in which the young plant has grown up after transplantation is regularly drained off in the *Utra nakshatra* (12th—25th September), a period when, as a rule, there is little rain; and after the exposure of the soil to the air and sun, the usual heavy rain of the *Hathiyā nakshatra* (26th September—7th October) is awaited. After this, it is the universal custom to keep the fields wet during the *Chitra nakshatra* (8th—20th October); and at the commencement of the *Siwāti nakshatra* (21st October—3rd November) they are again drained, and the paddy is left to itself till the *Bisākha nakshatra* (4th—15th November) when it is cut.

Although there are sometimes slight variations in the times of sowing and transplanting from those given above, the cultivators are always careful to drain off the water from the fields in the *Utra nakshatra*. It may be said that every cultivator begins, if he possibly can, to let off the water on the first day of that *nakshatra*, and this is done, without any hesitation, in the country commanded by the canals, because the cultivator looks to them to supply him with water, whether the *Hathiyā* rain fails or not. It is generally agreed that after this draining (*nigār*) rice plants cannot exist for more than from 15 to 20 days, unless watered, without rapid deterioration; and as no ryot will take water till the *Hathiyā nakshatra* has commenced, the Canal Department is called upon to irrigate within a few days every acre under lease. If water is delayed a week after it is wanted at this stage, the crop suffers; if it is delayed three weeks, it withers beyond redemption.

Bhadoi crops.

The *bhadoi* crops require plenty of rain with intervals of bright sunshine to bring them to maturity, and constant weeding is necessary for a good harvest. The time of sowing depends on the breaking of the monsoon; if the rainfall is early, they are sown in the beginning of June; but they can be sown as late as the middle of July without the crop being lost. Harvesting usually extends from the 15th July to the 15th October.

Maize.

The principal *bhadoi* crop is maize or Indian corn (Zea Mays), known locally as *makai* or *janerā*, which is grown on 114,000 acres or 10 per cent. of the normal net croped area. It is sown in June and July and harvested in August and September. During the latter months the lofty bamboo platform (*māchān*), erected by the cultivator to serve as his watch-tower while the harvest is ripening, is a striking feature of the landscape; these platforms are erected because the crop has to be carefully protected from crows and jackals. Maize is very largely the poor man's food,

being consumed in the form of *sattu*, while the cobs are parched and form a favourite article of diet.

The *bhadoi* crop most extensively grown after maize is *marud* (Eleusine Coracana), which is raised on 63,800 acres or 6 per cent. of the normal net cropped area. This is a valuable millet, which is sown at the commencement of the rainy season and cut at the end of it. It is partly sown broadcast and partly transplanted to ground that afterwards gives a winter crop. The grain is largely consumed by the poorer classes in the form of *sattu*, or is converted into flour and made into a coarse bread; in bad seasons, when the rice crop fails, it supports them till the spring crops have been harvested. *Marua.*

Jowâr (Sorghum vulgare) is another valuable millet grown on 15,500 acres; it is sometimes called *jinorâ* or *janhari*, *i.e.*, the little *janerâ* (maize) with reference to the smallness of its seeds as compared with those of maize. *Jowâr.*

Kodo (Paspalum scrobiculatum) is another millet sown on poor lands early in the rains and reaped after they are over. It is a millet cheaper than rice, which is popular with the poorer classes, as it can be readily grown on an inferior soil; it is eaten boiled like rice or sometimes in *chapâtis*, but is not very nutritious. *Kodo.*

Ploughing of the fields for the *rabi* crops commences early in the rains and is continued at convenient intervals, sufficient time being given to allow the upturned soil to be exposed to the air. In the case of clay soils in unirrigated parts, more frequent ploughing is necessary for all *rabi* crops, because otherwise the soil would become so hard that, if there was no rain at the sowing time, a crop could not be sown. The time of sowing *rabi* is generally regulated by two circumstances—the heavy rains of the *Hathiyâ nakshatra* (26th September to 7th October), and the approaching cold season. If sown too late, the plants will not become strong enough to resist the cold; if sown too early, the heavy rain will probably drown the seed and sprouting crop, and so necessitate re-sowing. The cultivators are thus anxious to sow as soon as the heavy rains have ceased, and the general rule is that the proper time for sowing most *rabi* crops is the *Chitra nakshatra* (8th to 20th October), and that it must not be delayed beyond the *Swâti nakshatra* (21st October—3rd November). A sufficient supply of water is essential at this time; later on several waterings are required, and if there is no rain, the crops have to depend on well irrigation. They are finally harvested between the last week of February and the middle of April. *Rabi crops.*

The most important of the cereals is wheat, which occupies altogether 125,600 acres or 11 per cent. of the normal net cropped *Wheat.*

area. Sowing begins in October, the seed being sown broadcast or by means of a seed-drill, called *chura*, attached to the plough; and the crop is harvested in March. Wheat is regarded as one of the most delicate of all the *rabi* crops.

Barley.

Barley is grown on a normal area of 75,000 acres (6 per cent. of the normal net cropped area), mostly on the sandy loam called *balsundri*. Sowing takes place in November, after the soil has been prepared by ploughing, and has been manured with ashes and cow-dung when they are available. The crop is usually not irrigated if there are timely showers, but in a dry season it receives a few waterings from any adjacent well. It is, as a rule, ready for harvest in April.

Gram.

The other great class of *rabi* crops consists of pulses, of which gram or *bût* (Cicer arietinum) is by far the most extensively grown, a normal area of 82,100 acres or 7 per cent. of the normal net cropped area being given up to it. Besides forming an excellent fodder for horses, this pulse is eaten by the natives in all stages of its growth. The young leaf is eaten and the grain is split and converted into *dâl*, or pounded into *sattu*.

Among other *rabi* crops may be mentioned peas, the *china* millet (Panicum miliaceum), *kulthi* (Dolichos biflorus) and various pulses and lentils, such as *arhar* or *rahar* (Cajanus indicus), *masuri* (Ervum Lens) and *khesâri* (Lathyrus sativus), the crop last named being frequently sown broadcast among the rice stubble.

Oil-seeds.

Oil-seeds occupy an important position among the *rabi* crops. The chief is linseed (Linum usitatissimum), which is grown on a normal area of 13,400 acres; it is nearly always sown separately or with wheat and gram. The other principal oil-seeds are mustard and rape, which are grown on 12,400 acres.

Castor oil.

The castor oil plant is the special crop of *diâra* lands. There are 2 varieties, one large and the other small. The former is sown mixed with *bhadoi* crops, while the latter is a *rabi* crop sown in September and reaped in May. It is reported to yield 4 to 6 maunds to the acre, while one maund produces about 16 seers of oil.

Other crops.

The fibre crops are inconsiderable, the normal area being 3,900 acres, of which 1,100 acres are occupied by cotton. Jute is not grown. Tobacco is grown on the small area of 2,000 acres, and is of little economic importance. Of the other food crops by far the most important are sugarcane and poppy.

Sugarcane.

Sugarcane, which is grown on a normal area of 20,200 acres, is one of the most profitable crops grown in the district in spite of the labour and expense its cultivation requires. It is a crop which not only exhausts the soil, but occupies the ground for a

long period, extending over a year. It is planted during February or March, in cuttings of about a foot in length placed in rows about 2 feet apart. When the plant begins to sprout, it is well watered and the surrounding earth is loosened. Each plant grows into a cluster of canes, which are generally ready for cutting in January or February. The crop requires great care, and must be frequently irrigated.

Poppy. The poppy generally cultivated in this as in other districts of Bihár is *Papaver somniferum* or *album*, a plant with white flowers and white seeds, which is better suited to the climate than the red or purple flowered kind which is extensively grown in Málwá. There are two species commonly grown, one with extremely serrated leaves, which is held to be the superior kind, and another with red and white petals, and also having very serrated leaves, which is grown to a very small extent; the latter produces opium of excellent quality, but the yield seems to be small. The production of opium being a Government monopoly, no person is allowed to grow poppy except on account of Government. Annual engagements are entered into by the cultivators, who, in consideration of the payment of an advance, agree to cultivate a certain quantity of land with poppy and to deliver to Government the whole of the opium produced at a rate fixed according to its consistence. The price paid is Rs. 6 per seer for the standard consistence of 70 degrees, *i.e.*, if it contains 70 per cent. of pure opium, and it increases or decreases *pro rata* according as the opium is above or below that standard.

The best soil for poppy is a sandy loam, so situated that it can be highly manured and easily irrigated, and for this reason homestead land is generally selected. It is customary to grow poppy after maize, wherever possible, the ground being prepared as soon as the maize has been removed; but in a few rare cases the land is left fallow during the rains. The cultivation requires much attention throughout the growth of the plant. The ground is prepared by repeated ploughings, weedings, and manuring; cow-dung, ashes and sweepings are the manures chiefly used, but the manure available is yearly decreasing as the supply of cow-dung is generally required for fuel in the absence of a sufficient supply of fire-wood. The seed is sown from the third week of October till the middle of November. Several waterings and weedings are ordinarily necessary before the plant reaches maturity in February; to facilitate the process, the field is usually divided into small squares, and in some places is laid out in ridges as in potato fields.

After the plant has flowered, the first process is to remove the petals, which are subjected to a process of baking, and thereby made to adhere together, and manufactured into thin round sheets, about 9 inches in diameter (known departmentally as leaves), which are used afterwards as coverings for the provision opium cakes. The opium is then collected during the months of February and March, by lancing the capsules in the afternoon with an iron instrument and scraping off the exudation the next morning; this instrument, which is called a *nahurni* or *nastar*, consists of a kind of four-pronged lancet tied round with string, so that only about one-twelfth of an inch of steel protrudes. From the beginning of April the cultivators bring in their opium to the weighment centres of the different sub-agencies, where it is examined and weighed, and the balance due according to the Opium Officer's appraisement is paid to them on account, after deducting the advances made. Final adjustments are made between August and October, after the value of the drug has been ascertained by assay at the Patna Factory, where the final process of preparing the drug in balls or cakes is conducted.

There is a tendency for the cultivation of poppy to decrease, as year by year it is becoming less profitable to the ryots. The plant is delicate; a thoroughly favourable year (such as 1903, when some cultivators' fields produced as much as 18 seers of opium per *bigha*) comes only at uncertain intervals; and the cultivators have had to contend with a number of bad seasons. There is accordingly a marked tendency to withdraw from an industry so precarious and to substitute the more robust cereals or such paying crops as potatoes, chillies and vegetables, which can generally be grown at a greater profit and with less trouble. This movement has been quickened by the fact that the value of cereals has increased of recent years, while the price paid for the crude drug has remained stationary since it was raised in 1895. The rapid extension of railways has also been a very important factor in reducing the popularity of poppy cultivation. Formerly, when railways were few, opium had a great advantage over cereals or other crops, in that the drug was valuable and occupied only a small space, considering its value; but as railways increase, this advantage disappears, and the cultivator naturally prefers less delicate crops. The result of these combined influences is shown in the decrease of the area under cultivation from 26,314 acres in 1881-82 to 11,017 acres in 1906-07. An account of the manufacture of opium will be found in Chapter IX.

Vegetables and fruits.

Vegetables are cultivated in garden plots for household use and also on a larger scale in the neighbourhood of towns. The

most extensively grown are the potato, egg-plant or *baigun* (Solanum Melongena), and groundnut (Arachis hypogæa), white pumpkins (Lagenaria vulgaris) and gourds (Benincasa cerifera) may be seen climbing over the roofs of the houses in nearly every village. Onions, yams, turnips, cabbages, beans, sweet potatoes and cucumbers are also common, and in the winter radishes, carrots and melons are cultivated. Potatoes are grown very extensively and are exported in large quantities, the Patna potato being one of the best varieties grown in the Province. Melons are grown in considerable quantities in the fields near the bank of the Ganges; they are of 2 kinds, the musk melon or *kharbuza* and the water melon or *tarbuz*. Both are sown in sandy soil, generally in October, and come to maturity in March or April. There are also two kinds of cucumber, one a large variety called *kakri* and the other a smaller species called *khira*. Pumpkins and gourds are put to a variety of uses. They are eaten raw and also in curries; and the rind is used by fishermen to float their nets; while the hollow gourd is used by musicians as a sounding board for their guitars and by religious mendicants to serve as a water-bottle. Among condiments the favourite is the chilly, which is grown in large quantities near the homesteads; turmeric, coriander and ginger are also cultivated extensively.

The most popular fruit is the mango, which grows freely and forms a valuable addition to the food of the people during the hot weather, though the flavour of the local fruit is decidedly inferior to that of the Mālda and Bombay varieties. Of the other cultivated fruits, the commonest are the plantain, lemon, *lichi* (Nephelium Litchi), jack fruit (Artocarpus integrifolia), custard apple (Anona squamosa) and *bel* fruit (Ægle Marmelos). The *khajur* tree (Phœnix sylvestris) is cultivated abundantly for the sake of its juice, which is made into liquor; and the *mahuā* flower is used for the manufacture of country spirit and is also eaten by the poorer classes. Last but not least among local fruits may be mentioned strawberries, which, though small, have a delicious flavour. They are grown in large quantities at Dinapore, which has as high a reputation for its strawberries as Bankipore has for its roses.

EXTENSION OF CULTIVATION.

Out of the total area of 2,075 square miles comprised in the district, no less than 1,686 square miles are now under cultivation, 191 square miles being twice cropped; and there are only 69 square miles of culturable waste other than fallow. The Bihār subdivision contains the largest uncultivated area in proportion to its size, viz., 207 square miles out of a total area of 791 square miles, while the headquarters subdivision contains the least, viz., 77 square miles

out of a total area of 334 square miles; but it must be remembered that in Bihār a large tract is covered by the rocky Rājgīr Hills, and only 27 square miles are culturable waste. In the district, as a whole, nearly the entire area capable of cultivation is already under tillage, and there is little room for a further advance of the plough.

IMPROVEMENT OF METHODS.

The Bihāri is, on the whole, a conservative cultivator with an apathetic indifference to agricultural improvements, and the Patna peasant is no exception to the general rule. Various experiments have been made from time to time in the Government and Wards' estates with different varieties of manures, seeds and modern implements, but these experiments have had little influence on cultivation generally. Practically, the only new appliance which has found favour with the people is the Bihiā sugarcane mill. This is an iron roller mill worked by bullock-power, invented in 1874 by the proprietors of the Bihiā estate in Shāhābād, and hence known as the Bihiā mill. Its popularity is now firmly established, and the old-fashioned wooden mills which necessitated the cutting up of the cane and extracted a mere fraction of the juice are now no longer seen.

Selected seeds and new varieties of crops have also failed to find favour, with the exception of potatoes, which the cultivators, especially those along the bank of the Ganges, have taken up vigorously. An agricultural experimental farm has recently been started at Bankipore, south of the railway station, 927 *bighas* having been acquired for the purpose; and an Agricultural Association has also been formed. It is hoped that these institutions will help, to some extent at least, to popularize improved methods of cultivation.

Rotation.

The scientific rotation of crops is not adopted as a principle of agriculture, but is observed as a matter of practice, especially in the case of the more exhausting crops, such as sugarcane, which is never grown on the same land year after year, but is always alternated with other crops, generally with rice. A great part of the land growing winter rice bears that crop year after year, but sometimes a second crop of *khesāri* is raised, or if the land continues moist until harvest time, it may be ploughed and sown with gram and peas or barley. The *bhadoi* crops of early rice, maize and millets are also followed by a mixture of various pulses and oil-seeds with wheat and barley, the mixture of pulses and cereals serving the purposes of rotation, as the pulses belong to the leguminous family and enrich the soil with nitrogen.

Manures.

Manure is largely used for poppy, sugarcane, potatoes and other garden produce, but not as a rule for other crops.

Cow-dung is the most important manure, but its value is much diminished by the negligent manner in which it is stored. Besides this, a great deal is lost by conversion into fuel cakes, as firewood is scarce, and its high price makes its use prohibitive for the ryots. For the most part, therefore, cow-dung only finds its way to the fields in the form of ashes; and the only other manure in common use consists of household refuse.

CATTLE. In addition to the ordinary country breeds there are two local varieties of cattle, one a cross between the Hansi and the country breeds, and the other a three-quarters or half English-breed known as the "Bankipore breed." The former class are large massive animals; the bullocks do well for carts and for ploughing, but the cows are not very good milkers. The Bankipore breed is the residue of an English stock imported some 50 years ago by Mr. William Tayler, formerly Commissioner of Patna, who started a cattle farm at Lohānipur south of the Bankipore railway station and also inaugurated an agricultural exhibition. The animals are not usually very large, but the cows are excellent milkers, giving from 8 to 16 seers daily; owing to their smaller size they cost much less to keep than the other breed. The bullocks are not heavy and strong enough for the work required of them, and are not thought much of by the natives. The breed has deteriorated greatly through in-breeding and want of new blood. To improve the strain the Patna District Board imported two bulls from Australia; and more recently it has purchased a Montgomery bull for the improvement of the indigenous breed.

Cattle fairs are held at Bihiā in the Dinapore subdivision twice in the year, about the 13th Phāgun and the 13th Baisākh. An agricultural exhibition is held annually in connection with the former fair, towards which the District Board contributes, and which also receives grants from Imperial and Provincial Funds for prizes for cattle. A cattle fair is also held at Ainkhān Bazar in the Bikram thāna of the Dinapore sub-division.

Cattle of the local breed, though hardy and suited to the climate, are generally of a very mediocre stamp; little or no care is taken in selecting bulls for breeding, immature or poor specimens being used; and the Brāhmani or dedicated bulls are usually no better than their fellows, though the freedom with which they are allowed to graze keeps them in better condition. The stock has thus little chance of improvement, and besides the want of careful and systematic breeding, there is difficulty in obtaining pasturage. Grazing grounds are few, and fodder is

scarce, for during the hot weather the ground retains little moisture and the grass is parched up by the burning sun. Nearly all the land available for pasturage, moreover, has been given up to cultivation; and the cattle have to be content with the scanty herbage found in the arid fields or are stall-fed on chopped straw, maize stalks, and occasionally linseed.

Buffaloes are employed for the plough, especially when deep mud is being prepared for the transplantation of paddy, and are also used for slow draught work, but their chief value is for the milk which they yield in large quantities. Sheep are reared on a small scale, but are undersized and of poor physique. Goats are bred in almost every village, and pigs of the usual omnivorous kind are kept by the low castes, such as Doms, Dosâdhs and Musahars. The only horses are the usual indigenous ponies; they are generally undersized and incapable of heavy work, but those used for *ekkâs* often have astonishing endurance and a great turn of speed. Though very hardy, they are generally broken in too early, and are sometimes starved or worked to death before they are 7 or 8 years old.

Veterinary assistance.

Veterinary assistance is afforded at a veterinary dispensary which the District Board and the Patna Municipality jointly maintain at Patna; 114 horses and 35 cattle were treted as in-patients at this dispensary in 1905-06, and 2,263 horses and 361 cattle as out-patients.

CHAPTER VII.

IRRIGATION.

INDIGENOUS SYSTEM.

THE agricultural prosperity of Patna depends largely on an extensive system of artificial irrigation. To the west the cultivators have the benefit of a portion of the Son canal system, and are thus certain of an ample and regular supply of water; but elsewhere the people are dependent on indigenous methods of irrigation which have practised from time immemorial. This indigenous system is so devised as to utilize not only the rain water and the water brought down by the rivers debouching from the Gayā district, but also as much of the flood water as possible. This is done chiefly by means of reservoirs, called *āhars* or *khazānas*, which are formed by constructing retaining embankments across the line of drainage. The water is impounded in these reservoirs and distributed over the fields through narrow irrigation channels called *karhās*. Wherever the level of the fields to be irrigated is lower than that of the *āhar*, water is led into the *karhās* through pipes known as *bhoklās*; while if the level of the fields requiring irrigation is higher, water is raised to the requisite height by means of artificial water-lifts. The water, after being carried to the fields, is retained in them by means of a network of low banks (*āl*) called collectively *genrābandi*.

In the south of the district dams are built across the streams in order to divert the water for the irrigation of the land, and in the south-east there are a number of long water channels or *pains* leading from the rivers to the fields. In the extreme east of the district in low *tāl* lands, where flood water is naturally retained longer by the soil, *āhars* are not needed, and the cultivators have recourse to temporary wells. Such wells are also generally used in the fertile tract lying immediately to the south of the Ganges, owing to the proximity of which neither *āhars* nor *pains* are required.

Āhars.

In Patna *āhars* are the most important works of irrigation owing to their number and the large area they supply. An *āhar*

is an artificial catchment basin formed by blocking the drainage of the surface water, or even a small drainage rivulet, which thus locks up the water and stores it for the supply of the fields. These catchment basins are nearly always of a more or less rectangular shape, embankments being raised on three sides of the rectangle, while the fourth side is left open for the water to enter. The highest embankment is at the lowest end, and the other two embankments project from either side, diminishing in height as the level of the ground rises. In this way a three-sided catchment basin is formed, following the slope of the land and having some arrangement to let out water, at the spot where the drainage would naturally issue if there were no embankments.

If the *āhar* is built across a drainage channel or other rivulet, and thus may receive more water than it can hold, there is a spill or weir to pass off surplus water, which may then flow on to another *āhar* lower down. In small *āhars*, where the quantity of water banked up is not great, it is generally sufficient to cut a narrow passage through the earthen bank at the deepest spot to draw off the water as required. If the mass of water is great, a half pipe, formed out of the trunk of a palm tree and known as a *bhoklā*, is let into the bank to protect it from excessive erosion. The different parts of an *āhar* have also distinctive names. The bed inside the embankments is the *pet* or belly, the banks are called *pind*, and the main bank at the lowest side of the *āhar* is the *pīth* or back, a name which is also frequently given to the portion behind the embankment.

When the water is wanted to irrigate lands on the same or a higher level, it is lifted by one of the methods used for raising water described later on. One or other of these lifts is erected on the edge of the *āhar*, and the water is raised into a channel on a higher level, through which it flows to the fields where it is required. If the water in the *āhar* is low and does not reach the bank, a depression (*kandāri*) is dug by the side of the bank and a small channel is cut from the deep part of the *āhar* leading into this depression. Sometimes, when the level of the water is very low, it is necessary to employ a series of two or even three lifts to raise it to the level required.

Small repairs to *āhars* are done by the cultivators, while those requiring considerable expenditure are carried out by their landlords.

Irrigation from rivers.

Towards the south of the district it is a common practice to build dams (*bāndhs*) across the rivers, which often divide into a number of small channels which are easily dammad. These dams

are most frequent in the Bihār subdivision, which is intersected by numerous streams, generally containing little or no water, but at time of heavy rain filled from bank to bank. The water is diverted into the various channels and reservoirs by means of these dams; they are cut as soon as a sufficient supply of water has been obtained, and the stream then rushes on till it comes to the next dam. *Pains*, or artificial watercourses, are usually employed to carry off the river water in the comparatively dry tracts near the hills. They are generally led off from a point some way upstream above the level of the land they are intended to irrigate; but very long *pains*, with an extensive system of distributaries, are not found in this district as in Gayā. In many cases nearly all the water of the streams and rivers is diverted by means of *pains* and dams, and is absorbed before they ever reach the Ganges.

Genrābandi.

The system known as *genrābandi* is chiefly employed to supplement artificial irrigation from rivers, *āhars* and wells, its object being to render irrigation more effectual by giving the soil full time to absorb the moisture. In order to secure this object and to prevent the water escaping, a series of low retaining banks are built, which are connected with other banks at right angles. The main outer embankment (*gherwā*), which is about 4 feet high, encloses a considerable area; this is split up by minor embankments called *genrā*, and within these again are low banks (*dl*) round the fields. This series of banks, which has aptly been described as resembling an enormous chess-board, is admirably adapted for retaining water in the fields.

Wells.

As water does not remain in the rivers for more than a few months in the year, irrigation must be carried on from *āhars* or wells when this source of supply fails. In a very dry season the *āhars* also dry up by the end of the year, and from January to June recourse must be had to wells except when rain falls. Well irrigation is universally employed for land growing market and garden produce, poppy, and other crops in the immediate vicinity of the villages, where the produce is much better and more valuable than in the land further from the village which is irrigated from *āhars*. Temporary wells are also commonly used for irrigation in the *tāl* lands and in tracts where the soil is sandy or along watercourses. They are most extensively used in the strip of fertile land adjoining the Ganges.

Water-lifts.

The methods of drawing and distributing water are those common to the whole of Bihar, and here, as elsewhere, the most usual contrivance for lifting it is the *lāthā* or lever. This consists of a long beam working on an upright forked post, which serves

as a fulcrum; at one end the beam is weighted with a log, stone or mass of dried mud, and at the other is a rope with a cone-shaped bucket attached, which when not in use rests above the well. When water is required, the cultivator pulls down the rope till the bucket is immersed; as soon as the tension is relaxed, the weight attached to the lever raises the bucket of itself; and the water is then emptied and led by narrow channels into the fields.

Irrigation by means of the *mot* (leather bucket) is much rarer. When this method is employed, water is raised by a large leather bucket secured to a rope, which passes over a rude wooden pulley supported by a forked post, and is fastened to the yoke of a pair of bullocks. These supply the motive power, for as soon as the bucket has been filled, they descend an inclined plane, varying in length with the depth of the well, and thus bring it to the surface. One man is required to look after the bullocks, and another is stationed on the well to let down the *mot* and empty it when it comes to the surface.

Two other water-lifts commonly used are the *karing* and the *sair* or *chānr*. The *karing* is a long wooden scoop, made out of a single piece of wood, hollowed out and shaped like one-half of a canoe. The broad open end of this scoop rests on the water-channel leading to the field, and the pointed closed end is dipped into the water, which is then raised by means of a lever overhead with a weight at the end of it. This machine is used for lifting water either from the reservoirs (*āhars*) or from a lower to a higher channel where water is plentiful and the elevation small. The *sair* or *chānr* is used when the quantity of water remaining is small; it is a triangular basket made of bamboo with the edges raised on two sides; cords are attached to each side, and these are held by two men, one standing on either side of the place from which the water has to be raised. Holding the ropes attached to either side, they swing the basket backwards, and bringing it down sharply into the water, carry the forward motion of the swing through, until the basket, now full of water, is raised to the level of the water channel, when the contents are poured out.

Working of the system.

There can be no doubt that the indigenous system of irrigation described above is indispensable to Patna, and that without it a large portion of the district would be converted into unculturable waste. In the Bihār subdivision, where such irrigation works are most common, and where they are absolutely necessary to render rice cultivation possible, they are directly connected with the *bhāoli* system of produce rents. Their construction

requires a large expenditure, which the ryots themselves would be unable to afford, and a degree of combination, which they have not yet attained. The whole of the tenants in one village may depend upon the water obtained from one *dhar* or *pain*; one reservoir or channel again may serve several villages some distance apart; and it is quite beyond the means of the cultivators to construct and keep up such extensive works or maintain their rights in them against the encroachment of others. The landlord is the only person who can supply the capital for their construction or fight for the villagers' rights; and for this again ample means are necessary. Without *pains* and *dhars*, the tenant in many parts would get no rice crops; and on the other hand, if he paid a fixed cash rent to his landlord, the latter would be in a position to spend the money in other ways and neglect the duty of laying out channels and embankments and of keeping them in order. Custom has, therefore, decreed that these works shall be made and maintained by the landlord, while the tenant pays the latter a share of the actual crops. This arrangement serves the interests of both parties; for if the landlord constructs and maintains the irrigation works required—known locally as *gilandāzi*—he gets a large rent, and the tenants a good harvest; if he does not, he gets but little rent, and the cultivator is compensated for the poorness of his crops by the rent being commensurate with the outturn.

Expenditure on such works of improvement is, therefore, a good investment for landlords, as they rapidly repay the outlay; but, unfortunately, there is a tendency on their part to neglect this duty. Nearly all the large and important *pains* and *dhars* were made many years ago, when large areas were under the control of single zamīndārs, and the local authority of these zamīndārs to enforce their orders and wishes was more absolute than it is, or can be, under the restrictions enforced by the legislation of more recent times. As a general rule, no large *pains* or *dhars* are now made, and many of the largest of those constructed in former times have fallen into disrepair and even disuse; while a similar want of activity is seen on the part of landlords with regard to the construction of large or important irrigation wells. This neglect is due to the gradual disintegration of property, that *parcellement of* proprietary rights which has been encouraged by modern legislation. Where formerly there was a single zamīndār in more or less absolute authority, there are now perhaps fifty petty land-holders whose interests conflict or whose relations are so strained that they can never combine to carry out a work of mutual benefit. The same weakening of the

zamindār's influence has also led in recent times to more frequent disputes than formerly regarding the distribution of water from *dhars*.

Apart, moreover, from the attitude of the landlords, these artificial irrigation works are apt to break down owing to the absence of proper engineering knowledge. Those *dhars* which form reservoirs large enough to be of material use in storing water, hold back the drainage of considerable areas, and being in many cases not provided with proper escape weirs, they are liable to be breached on the occurrence of heavy rain and made useless for the time—and that too the time when they should be most useful. Similarly, the *pains* are not only neglected owing to the subdivision of proprietary rights, but they suffer from the want of proper headworks to control the inflow as well as to regulate the water level of the channel at its entrance. Much damage is consequently caused by their scouring out at the intake; and sometimes such widening and deepening ends in the *pains* becoming small rivers. In this way, the original bed of the river becomes silted up; the tract of country formerly irrigated from it by other *pains* taking off lower down are left without means of irrigation, and cultivated lands are converted into waste; while the main stream, having adopted the artificial channel of the *pain*, cuts away the adjoining land, and floods and depreciates other lands by a deposit of sand.

A very striking instance of the injury caused in this way is afforded by the Sakrī, the course of which between Bihār and Asthāwān has been altered by the construction of two large *pains*, which take off about 12 miles south of Bihār. These channels have for want of proper regulating works gradually enlarged themselves until they carry off more than two-thirds of the supply of the main river. They are now quite beyond the control of the landlords and do considerable damage when the Sakrī is in flood. A project was prepared for regulating the flow of water in these channels, but the landlords interested declined to pay the cost and the matter was dropped. The lower portion of the Sakrī river below the offtake of these channels is also silting up very rapidly as a continually decreasing supply of water passes down it, to the detriment of villages on its banks. How serious is the effect of such silting here and elsewhere will be understood from the fact that it has caused two parts of the district to be liable to scarcity, viz., the south-east corner of the Bihār thāna comprised within the Asthāwān outpost and the south of the Islāmpur thāna. In both these tracts the reason is the same, viz., that owing to the silting up of the channels from which the peasants used to obtain

their supply of water, the fields have lost the means of irrigation which they formerly possessed.

In the west conditions are entirely different, as this portion of the district is served by the Patna-Gayā Canal and its distributaries. The Patna-Gayā Canal forms a part of the Son canal system and branches off from the Main Eastern Canal in the Gayā district about 4 miles below the anicut between Dehrī and Bārun on the Son river. It enters the district at its south-west corner, just after passing Arwal, at the 43rd mile from its offtake. For some distance it runs parallel to the course of the Son, but soon turns to the east, following an old bed of that river, past the villages of Bikram and Naubatpur to Khagaul, where the East Indian Railway station for the military cantonment of Dinapore is situated. Thence it flows into the Ganges at Digha, a short distance to the west of the Digha Ghāt railway station, 79 miles from its head. Its length within this district is 42¼ miles, that of the parallel channels is 24 miles, and that of the distributaries 161 miles: one of these, the Maner distributary, acts as a flood bank and protects the Dinapore cantonment from floods. CANAL SYSTEM.

The canal, which was opened in 1877, was designed to irrigate the land lying between the Son and the Pūnpūn. It commands a total area of 626 square miles or over 400,000 acres, but the acreage actually irrigated from year to year is usually only one-eighth of this area; the maximum area irrigated up to date is 108,438 acres in 1896-97. In 1905-06 the area under irrigation was 54,497 acres and in the preceding 5 years the average area irrigated annually was 47,150 acres. The demand for water is steadily increasing, and the greater part of the supply is utilized for the irrigation of the rice crop; thus, out of the 54,497 acres irrigated in 1905-06 no less than 38,589 acres were under rice. It is also used largely for sugarcane, but is not regarded as so beneficial for wheat and other *rabi* crops. The canal carries a considerable trade of which the principal staples are oil-seeds, food-grains and bamboos, and a weekly steamer service is maintained along it, but since the opening of the Mughalsarai-Gayā Railway the traffic has decreased. The banks have been planted with trees, of which *sisū* and *tūn* seem to thrive best.

The canal system in Patna is under the control of the Superintending Engineer, Son Circle, whose headquarters are at Arrah, but the local officer in charge is the Executive Engineer, Eastern Son Division, who is stationed at Bankipore, and is assisted by an Assistant Engineer and a Subdivisional Officer stationed at Bikram. The latter are responsible for the Canal administration.

maintenance of the canal and the conduct of irrigation operations, and a separate establishment is entertained for the collection of the revenue.

The irrigated area is divided nto blocks, the lease of all the lands in each block being arranged so as to lapse in the same year; and in fixing the period of the leases efforts are made to see that leases for an equal area expire each year. Water is supplied to the cultivators on application on a prescribed form, the year being divided into three seasons, viz., hot weather, *khárif* and *rabi*. A date is fixed for each season, and the lease or permit granted for that season is only in force for that particular period. Besides these season leases, there are long-term leases, or leases for a period of seven years, which are granted at a somewhat reduced rate.

The long-term leases are only granted for compact blocks defined by well-marked boundaries of such a nature that the leased lands can be clearly distinguished from the adjoining unleased lands, and also so situated that unleased lands will not ordinarily be irrigated by water supplied for the land included in the block. These boundaries are mentioned in the application for the lease, on receipt of which a special report is submitted to the Subdivisional Officer. If the lease is likely to be approved, he issues orders for the block to be measured, and a detailed *khasrá* or measurement of each cultivator's holding is then made. The lease is finally approved by the Divisional Canal Officer who issues the permit, but before this can be done, every cultivator, who has fields within the block, must sign his name against the area which has been measured, and which will be assessed in his name. In order to admit of a lease getting water for the season, a provisional permit is granted for the season on the area originally applied for; this permit is cancelled when the long-lease permit is finally granted. Fields which cannot be ordinarily irrigated, or for which canal water is not ordinarily required, can be excluded from the block, such fields being duly noted in the *khasrá* or measurement paper.

In these long-term leases water-rates are charged for the area measured and accepted by the cultivators, whether water is required or not; and the channel by which the area is irrigated must be registered as well as the name of its owner. In *rabi* and hot weather leases water is supplied on application, and water-rates are levied on the actual area irrigated, and not necessarily on those specified in the application. In order to assist the Canal Department as far as possible in regulating and distributing the water to the different cultivators named in the leases,

influential men of the village, called *lambardārs* or headmen, are appointed on the approval of the majority of the cultivators concerned. Their duty is to assist in measurements, to report the names of the cultivators of the different holdings, and to see that water is properly distributed over the leased area. For these duties they are paid a commission of 3 per cent. on the total assessment in the case of long leases and of 2 per cent. in the case of season leases.

Water-rates.

There are five rates charged for the water supplied, viz., (1) *rabi* season leases from the 15th October to the 25th March at Rs. 2-8 an acre; (2) hot weather leases from the 25th March to the 25th June at Rs. 4-8 an acre; (3) leases during the same period at Rs. 2 for each watering; (4) *kharif* season leases between the 25th June and the 25th October at Rs. 4 an acre; and (5) seven years' leases for block areas for any kind of crop between the 25th June and the 25th March at Rs. 3 an acre.

Statistics of irrigation.

Accurate statistics of the area under irrigation are available only for the headquarters and Dinapore subdivisions, and those statistics relate only to the cultivated area irrigated by the Patna-Gayā canal system, which, as mentioned above, supplied water to 54,497 acres or 85 square miles in 1905-06. In the other subdivisions nothing more than estimates can be given, and all that is claimed for them is that they furnish approximate figures. According to these estimates, 42,000 acres in the Bārh subdivision and 287,000 acres in the Bihār subdivision are irrigated from private irrigation works, such as reservoirs, water-channels and wells. In the latter subdivision artificial irrigation is far more necessary than elsewhere, and the demand for water has created the means for its supply to such an extent that one of every 4 acres is under irrigation. In Bārh, where the necessity for irrigation is far less, one acre out of every 7 acres is under irrigation; while in the headquarters and Dinapore subdivisions one out of every 8½ acres receives a supply of water from the Patna-Gayā Canal. In the district, as a whole, it is estimated that a little more than half of the cultivated area is under irrigation.

CHAPTER VIII.

NATURAL CALAMITIES.

FAMINES. "GENERALLY, the Soubah of Behar," wrote Mr. James Grant in 1787, "derives its superiority over most of the other provinces of the Mogul Empire from the great natural advantages of a temperate climate; high and fertile soil, well watered, productive of the drier grains, and all the luxuries required by the more active, warlike inhabitants of the north; with a centrical situation, having easy communication internally, and serving as an emporium, or by means of the river Ganges, a thoroughfare to facilitate the commercial intercourse between Bengal, as well as foreign maritime countries, and the more interior provinces of Hindostan. Agriculture, manufactures and commerce have always highly flourished in this favoured province.*" Of all the districts in Bihār, these remarks applied, and still apply, with the greatest force, to the Patna district, a fertile tract of alluvial soil intersected by numerous rivers, which has been developed by some of the most industrious, adroit and capable husbandmen in India. It is unusually well supplied with communications, as the East Indian Railway traverses it from east to west, while the Patna-Gayā Railway and the Bakhtiyārpur-Bihār Light Railway run through it from north to south. The Ganges, with its large traffic in boats and steamers, flows along its whole northern length, and the Son forms its western boundary, while the city of Patna itself is one of the largest grain marts in the whole Province. The interior is well provided with means of communications and is fertilized by numerous streams and rivers. Add to this the fact that the people are not dependent on any single crop on the crops of any single season, as the area under cultivation is fairly equally divided among *aghani* (48 per cent.), *rabi* (40) and *bhadoi* (21) crops; and the result is that the district is practically immune from any general famine. Even if the local rainfall fails, the cultivators are able to obtain a store of water for their

* The Fifth Report from the Select Committee on the Affairs of the East India Company, 1812.

crops from the rivers flowing from the south and from the canal system in the west; while grain can be imported by rail, road, canal and river, and distributed by carts or pack-bullocks to all parts of the interior. No district in the Patna Division offers so many facilities for private trade or is so well protected against exhaustion of its food supply. Since the great famine of 1770 it has never suffered from any widespread scarcity, and even in 1897, when other districts suffered from one of the greatest famines on record, it was very slightly affected.

Famine of 1770.

The famine of 1770 was severely felt in Patna, which was one of the most cruelly stricken districts in the Province. In January 1770 we find Mr. Alexander, the Supervisor of Bihār, reporting: "To judge from the city of Patna, the interior of the country must be in a deplorable condition. From fifty to sixty people have died of absolute hunger on the streets every day for these ten days past." In April matters were far worse. The depopulation in the interior part of the country was, we learn, more rapid than would be imagined by any person who had not been witness to it; and such was the disposition of the people, that they seemed rather inclined to submit to death than extricate themselves from misery and hunger by industry and labour. "The miseries of the poor at this place increase in such a manner, that no less than 150 have died in a day in Patna."

In May the Supervisor urged that it was "absolutely necessary to remove the brigade from Bankipore beyond the Curamnasa, to save the lives of many poor people who might be subsisted from what the brigade consumed." It was, he said, the last necessity that induced him to make this proposal, but "the consumption of the army presses on the inhabitants." It was at last decided to remove two battalions and the cavalry from the cantonments to the Fort of Buxar; but at the same time, the Central Committee reminded Mr. Alexander that "Your neighbours, enjoying the blessing of almost a plentiful season, whilst you are suffering the evils of death and famine, exhibits but an unpleasant contrast, and rather wounds the credit of English policy. We have no doubt of your vigilance and capacity; but the Government of this country has provided so very imperfectly for the security of the poor, that, unless very extraordinary efforts are made to prevent it, these calamities never fail to occasion the grossest abuses." * These remarks sufficiently show the change in famine policy which a century of British rule was to effect.

* Sir W. W. Hunter, *The Annals of Rural Bengal*, Appendix A.

Relief was given, it is true, but it was left to private charity to feed the starving. "Mahārājā Shitāb Rai," says the Sair-ul-Mutākharin, "melted by the sufferings of the people, provided in a handsome manner for the necessities of the poor, of the decrepit, the old, and the distressed. In that dreadful year, when famine and mortality, going hand in hand, stalked everywhere, mowing down mankind by thousands; Shitāb Rai, who heard that grain was a little cheaper, and in greater plenty, at Benāres, set apart a sum of Rs. 30,000, and directed that the boats and rowers belonging to his household should bring regularly to Azīmābād (Patna), three times a month, the grain provided with that sum at Benāres. This grain being landed at Azīmābād, was sold at the Benāres price, whilst the boats were despatched for another trip; by which management there were always boats landing and boats loading. In this manner, during the whole time which the famine lasted, his numerous boats, divided in three squadrons, were constantly employed in bringing corn, which his people sold at the original price, without loading it with the charges, losses, and transport; and it was purchased by the necessitous, who flocked to his granaries from all parts. But as there were still vast numbers that could not afford to purchase grain so dear,* he ordered them to be divided into four classes, which were lodged in three or four gardens, or seats, surrounded by walls, where they were watched, as prisoners, by guards, but daily attended as patients by a number of clerks, who kept an account of them, and were assisted by a number of servants, who at stated times used to come loaded with victuals ready dressed for the Mussulmen, and with a variety of grain and pulse and a sufficiency of earthen vessels, and of firewood, for the Gentoos; at the same time, several ass-loads of small money, besides a quantity of opium, bang, tobacco, and a variety of other such articles, were distributed severally to each person, according to the kind he was accustomed to use; and this happened every day, and without fail. On the report of such generosity, the English and Dutch took the hint, and on his example, lodged the poor in several enclosures, where they were regularly fed, tended, and lodged. In this manner an immense multitude came to be rescued from the jaws of imminent death."

Famine of 1866.

When the famine of 1866 burst upon Bihār, the situation was entirely different, for not only was there a definite theory

* Rice, says the translator, Raymond, in a foot-note, sells in general at Patna at the rate of 120 lbs. for a rupee; wheat at 150; barley at 200; and *jowār*, as well as some other grains, at 300. "Hence, when grain sells at 30 or 40 pounds, as it did in 1869-70, it becomes so dear that the generality of people cannot afford to pay for it."

of famine relief, recognizing the responsibility of Government, but the East Indian Railway had been extended (1862) through the district and the means of internal communication increased and improved. Consequently, though high prices prevailed, distress was neither general nor severe. It began to be felt to a certain extent among the poorer classes in October 1865; and it was most intense in the south near the Gayá district and in a portion of the Bihár subdivision, owing to the partial failure of the rice crop, which is almost the sole cultivation in that part of the district. In June 1866 work was offered to the distressed on the repair of roads and excavation of tanks within the tracts where the pressure was greatest, but less than 1,000 persons attended the works. Gratuitous relief was also afforded at 7 centres, but this relief was almost entirely confined to paupers, mendicants and persons coming from other districts; the daily average number of persons supported in this way, and at the charge of the local funds, from the end of June till the end of November 1866, was only 2,147. The number of deaths reported by the police, as having occurred from starvation or from disease induced by want of proper food, was 907.

The high prices ruling during this famine were due not so much to the failure of the local produce, as to previous excessive exportation and the demand from the surrounding districts. Owing to the general high level of prices in Lower Bengal, the importations of rice were much below the average of previous years; but large imports of other kinds of grain commenced about June and continued till the abundant autumn harvest caused a fall in prices.

Famine of 1874.

Again in 1874 the district was far less slightly affected than other parts of Bihár, and though there was scarcity, it never culminated in famine. The first marked event which contributed to the scarcity was an inundation in July 1873, which seriously affected the prospects of the standing crops. While only a moderate amount of rain is required for the Indian-corn and *marua*, which form the staple food of the lower classes, and to mature the rice seedlings, no less than 13·4 inches fell in that month, followed by heavy showers in August, amounting to 11·78 inches more. In the headquarters subdivision, the country lying to the south and south-west of Bankipore was almost entirely submerged; but this state of things was not entirely out of the ordinary course, and in September 1873 the zamindárs complained more of the want of rain than of the damage done by the inundation. The Bárh subdivision, which is chiefly a *rabi* and *bhadoi* country, suffered most by the floods;

but the Bihār subdivision was not affected. On the whole, the rice crop gave hopes of a moderate outturn, if there was a good fall of rain in September and October. But only ·93 of an inch of rain fell at Bankipore in the first half of September, while in Bārh, Bihār and Dinapore the rainfall amounted to 1·30, 1·71 and ·75 inches respectively. In the latter half of the month, there was ·1 inch at Bankipore, ·34 in Bārh, ·21 in Bihār, but there was no rain at all in the Dinapore subdivision. In the months of October and November there was not a drop of rain anywhere, except ·12 inch in Bārh and ·15 inch in Dinapore; and in December there was only ·13 inch in the headquarters subdivision and no rain in all the other subdivisions. The result was a very scanty harvest of the rice crop. In the Bihār subdivision, indeed, there was about one-third of the usual outturn; but in the rest of the district there was, as compared with ordinary years, only from one-eighth to one-sixteenth of a fair harvest.

As to the effects of the scarcity and consequent rise in the prices of food grains on the people, though the lower classes were hard pressed, there was nothing like a famine. Grain was poured in by private traders in very large quantities; and works were opened in every part of the district, where there was the slightest demand for labour. Not a seer of grain was spent in this district in charitable relief; for where there was any demand for this kind of relief, in order to meet the needs of beggars and other destitute people, private charity, stimulated by the influence of the local authorities, was sufficient to satisfy all real wants.

Famine of 1897.

The district again escaped the stress of famine in 1897, though other districts of the Division suffered severely, and the rainfall of 1896 was both unseasonable and deficient. The rains broke late, *i.e.*, at the end of June, and were heavy, the rainfall in that month being 7·19 inches against a normal fall of 6·24 inches. More rain followed in the first half of July, viz., 8·97 inches against an average of 11·93 inches, and some little damage was done by floods. A prolonged drought succeeded, which lasted till the middle of August, during which month 10·05 inches fell against an average of 10·48 inches. This fall saved the *bhadoi* and enabled the ryots to transplant the rice seedlings, though the operation was later than usual and was not completed till well into September. A third downpour occurred in the middle of September, but it was only about half the average, viz., 3·70 inches against 7·04; and up to this time the deficiency from the 1st April was 7·28 inches. Not a drop fell after the

18th September, instead of the usual allowance of 3·25 inches in October, and by the end of that month the deficiency amounted to 10·53 inches or 25·53 per cent. of the average.

No parts of this district were, however, seriously in danger: the rainfall was not so deficient as elsewhere, and every available drop of water from the Son Canal was utilized: the result was that the *bhadoi* turned out a 10-anna crop, the *aghani* rice was 10½ annas, and the *rabi*, owing to the frequent showers throughout the cold weather, amounted to 12 annas. Fears were at first entertained for the Islāmpur thāna in the Bihār subdivision, but these soon passed away, and the only cause of inconvenience was the high range of prices, which from October 1896 undoubtedly pressed hardly on the large urban population and on the many who live on small fixed incomes. Practically, no relief had to be afforded except to starved wanderers and travellers passing along the highway between the United Provinces and Bengal, who required assistance at kitchens and poor houses.

Nothing more than local scarcity in the Bārh and Bihār subdivisions was found to exist, and though test works were opened, they were soon closed. The number of persons employed on these test works from October to December 1896, reckoned in terms of one day, was 26,430, and the expenditure was Rs. 4,650. In January 1897 gratuitous relief was started, and the monthly average of persons relieved between that month and October, when relief was stopped, was 5,600, the total cost of gratuitous relief being Rs. 10,350. The above figures only relate to the relief work done by the District Board, which spent in all Rs. 15,000. Besides this, a charitable relief committee was formed in February 1897, which spent nearly Rs. 16,000 in grain doles, money doles, grants of clothing, railway fares, and the maintenance of orphans.

Tracts liable to famine.

From the foregoing account it will be seen that Patna has escaped almost unscathed from the great famines of the 19th century; and an immunity from general famine may fairly be claimed for it. There are, however, two parts of the district liable to suffer from temporary scarcity—the south-east corner of the Bihār thāna within the Asthāwān outpost and the south of Islāmpur thāna, both within the Bihār subdivision. The reason in each case is the same, viz., that these areas have, owing to the silting up of certain channels, lost the means of irrigation which they formerly possessed.

Floods.

In the north of the district floods are occasionally caused by the Ganges and Son overflowing their banks; but such inundations rarely do any serious damage. The cultivators have their

flimsy huts washed down, but these are easily and quickly replaced, and they are recompensed by the soil being fertilized by a rich deposit of silt, which produces magnificent crops. Thus no real or lasting distress results, and it has never been found necessary to undertake any general measures for their relief. In the south also local floods are sometimes caused by the rivers breaching their banks owing to abnormally heavy rains in the hills, and occasionally also by a river leaving its old course and appropriating the channel of a *pain* or artificial irrigation channel. These floods however are of very short duration and cause little genuine distress.

Flood of 1897.

Big floods occurred in 1843, 1861, 1870, and 1879, and of late years the most serious inundations are those which occurred in 1897 and 1901. That of 1897 was caused by the Son in high flood running into the Ganges, which was itself high at the time; and it was also largely aided by heavy local rain. The Dinapore subdivision suffered most, and the damage was ascribed to the Patna-Gayā Canal, which prevented the water getting away to the east. It was pointed out, however, that though the canal slightly augmented the flood caused by the Son, it prevented a still more serious flood which might have come from the Ganges.

Flood of 1901.

The most disastrous flood within the memory of the present inhabitants occurred in September 1901 as the result of a simultaneous rise of both the Son and the Ganges. On the 1st September the level of the Son at the Koelwār bridge was only 9 feet, but by the morning of the 3rd idem it had reached the height of 17·6 feet; and the river continuing to rise throughout the night and all through the next day, the gauge showed the unprecedented flood-level of 22 feet by 2 A.M. on the 5th September. At the same time, owing to a high Himālayan flood, the Ganges was rising abnormally high, and on the morning of the 5th September the flood-level of that river also was higher than any previously recorded, the gauge at Dīgha reading 35·10 feet in the early morning and 35·60 feet at midday. The Son, being unable to discharge the volume of its waters into the Ganges, forced its way over its eastern bank and poured over the low-lying lands towards Maner. The Ganges itself inundated the country along its banks throughout the whole breadth of the district. To the west at Dīgha it rushed down the Patna-Gayā Canal and breached its western bank about 2 miles from its mouth. Owing to this breach, the low-lying ground between the Dinapore-Patna road and the East Indian Railway line was submerged in one direction, and that between the canal and the Dīgha Ghāt railway line

in another; while further to the east of the line the overflow of the Ganges formed a great lake extending as far as Bankipore.

Altogether 257 villages were flooded, but, in spite of the extent of the inundation, the damage caused was comparatively slight. Only one person was drowned—a man who was caught with his buffalo in a whirlpool near Maner. One remarkable escape is recorded. A man and his daughter living on a *diāra* opposite Hājīpur were carried away on the top of their cowshed on the night of the 4th September. On the afternoon of the 6th the woman was discovered at Bārh on one-half of the roof and was rescued, while the father was carried down as far as Mokāmeh and was then brought to land. The *bhadoi* crops were damaged a little in the interior and were completely destroyed on the *diāra* lands; but it must be remembered that many of these *diāra* lands never yield *bhadoi* crops, though they are sown every year in the hope of a dry season. On the other hand, both the *rabi* and winter rice crops were benefited by the silt left by the receding waters, and in the Dinapore subdivision some lands were brought under cultivation which had been allowed to lie waste. Over 3,000 houses were destroyed, especially along the bank of the Ganges from Patna city to the Dinapore cantonments and in the Maner thāna; but in the former tract the inhabitants cannot expect anything else when they build their houses on the edge of a great river like the Ganges. The Dinapore-Patna road was overtopped for 3 miles of its length, and some parts were badly scoured. The country on both sides of the railway from Bihtā as far as Arrah was an inland sea 15 miles long, and there was a breach on the gradient to the Son bridge. The Maner-Bihtā road had 3½ feet of water over it, but it went down within 24 hours. The rapid subsidence of the flood was equally marked elsewhere, and to this fact must be attributed the comparatively slight damage done, though the flood was the greatest within living memory.

CHAPTER IX.

RENTS, WAGES AND PRICES.

SYSTEMS OF RENT PAYMENT.

THERE are two systems of rent payment prevalent in the district of Patna, viz., the *bhāoli* system, under which rents are paid in kind, and the *nagdi* system, under which they are paid in cash. The *bhāoli* system is specially in vogue wherever the cultivation of any particular crop, such as rice, is largely dependent upon help rendered by the landlords in making and maintaining works of artificial irrigation, as is the case in the Bihār subdivision. Most of the land under cultivation in the low *tāl* lands to the extreme east is also held under the *bhāoli* system. This is due to the fact that in this area the outturn of the crops is very uncertain, the yield being largely affected by the vicissitudes of the season, and a fixed cash rent would, therefore, tell with peculiar hardship upon the cultivators in a year of scanty rainfall or of excessive floods. Elsewhere the two systems of rent payment are not localized or confined to particular tracts, but co-exist all over the district, and the majority of the cultivators hold some land under both systems. Except, however, in the special cases mentioned above, the system of payment of rent in cash is, as a rule, preferred by the cultivators, because it leaves them a larger margin of profit, and saves them from the peculation and disputes inseparable from the complicated method of appraisement and division in vogue in connection with the *bhāoli* system. Cash rents are also invariably paid for land under poppy, sugarcane, and garden produce, and generally speaking for all lands which require special care and expense; and this is usually the case with homestead land, as it is peculiarly adapted for the growth of special crops, and the cultivator can cultivate it entirely by his own means.

Bhāoli system.

The *bhāoli* system is most prevalent in the Bihār subdivision, where it is estimated that produce rents are paid for two-thirds of the area under cultivation. Here it is the direct outcome of the system of artificial irrigation works, such as *pains* and *āhars*, without which rice cultivation would be impossible. The landlord

is the only person with sufficient capital to undertake the construction of such works; and according to immemorial custom, it is his duty to make and maintain them, each tenant paying his quota of the expense by giving a certain portion of the harvest as rent. This arrangement makes the amount of the landlord's rent depend entirely on the extent to which he provides facilities for irrigating the land. Splendid rice crops are obtained wherever the embankments and water-channels are kept in proper working order; and on the other hand, where they are neglected, the yield falls off enormously in a year of capricious rainfall. The actual produce of the land, therefore, varies in proportion with the extent to which the zamīndārs incur expenditure on irrigation; and the tenants' interests are also safeguarded. For, if the landlord does not bear what are called *gilandāzi* charges, *i.e.*, does not maintain the reservoirs properly, the crop is a failure, and he gets little or nothing; while if he spends an adequate amount on such works, a good harvest is reaped and he gets a good outturn for his outlay. Rents are, accordingly, paid in kind for lands benefited by irrigation works constructed at the landlord's expense; and as his profits are directly affected by the outturn, this system gives the tenant some assurance that he will not neglect their maintenance.

The ideal rule of the *bādoli* system is that the produce should be divided half and half between the landlords and tenants. Such a division, however, is very rare, being restricted to the case of high caste tenants or tenants whose right to such a division has been affirmed by a Civil Court decree. The most general rule is that nine-sixteenths of the produce is taken by the landlord and seven-sixteenths is retained by the tenant; this rate is called *nausattā*. In exceptional cases the landlords may take less than half a share of produce, *e.g.*, in time of drought, or when waste land has been brought under cultivation, or in special cases, when the cultivation requires unusual labour on the part of the tenant. In these cases the settlement is always for a limited period and often on a progressive scale. The customary rates in these exceptional cases in Patna are:—(1) another form of *nausattā*, where seven-sixteenths goes to the landlord and nine-sixteenths to the tenant; (2) *tihaiyā*, where one-third goes to the landlord and two-thirds to the tenant; and (3) *pachchā duā*, where two-fifths of the produce is given to the landlord and three-fifths is kept by the tenant.

One peculiar form of this system is known as *mani bandobast*, under which a certain fixed quantity of grain per *bigha* is paid

as rent, irrespective of the proportion it bears to the whole crop. In Patna this system is found almost exclusively in the case of the landlord's *zirāt* or home-farm lands. A variety of this system is called *chaurahā*, in which the rent consists of a certain number of maunds of cleaned rice per *bigha*. This tenure also is principally adopted by landlords when letting their *zirāt* lands.

Batāi. The share of the produce which the landlord receives is determined either by *batāi*, *i.e.*, the actual division of the crops, or by *dānābandi*, *i.e.*, the appraisement of the crop before it is reaped. Generally, each village has a fixed custom as to the payment of rent by *batāi* or *dānābandi*. Under the *batāi* system or *agorbatāi*, as it is also called, because the landlord's men have to watch (*agornā*) the crops carefully to prevent their master being robbed, the grain is harvested by the cultivator and carried by him to the threshing floor, where it is divided between the landlord and tenant, after the payment of the allowances given to the harvesters and others. Whatever the proportion, however, the tenant's share is usually augmented by his being allowed to keep the *tari*, *i.e.*, the refuse grain mixed with the dust which is left after the bulk of the crop has been removed from the threshing floor, as well as all the straw, chaff and any grain blown away during winnowing.

Dānā-bandi. Under the *dānābandi* system the division of the produce has passed into an estimate of its quantity or value before the crop is cut. The produce of each field is appraised before the harvest and the ryot is allowed to take the whole away, being debited with the landlord's share or its value. When the crops are nearly ripe, the landlord, or his agent, and the cultivator repair to the field, accompanied by the *patwāri* or village accountant, an *āmin* or assessor, a *jaribkash* or measurer, a *sālis* or arbitrator, a *navisinda* or writer, and the village headman. The measurer having measured the field with the local pole, the arbitrator goes round it, and after a consultation with the assessor and the village officials, estimates the quantity of grain in the crop. If the tenant accepts the estimate, the quantity is entered in the *patwāri*'s field-book (*khasrā*), and the matter is considered settled. If the tenant objects, or if the assessor and the arbitrator cannot agree, the fellow-tenants are called in as mediators, and if they fail to convince either party, a test crop-cutting (*partāl*) takes place, the landlord selecting a portion of the best part of the field, and the tenant an equal area in the worst part. The produce of both is reaped and threshed, and the grain having been weighed, the whole produce of the field is calculated

from the amount weighed, and is entered in the field-book. The tenant is then at liberty to reap the crop and harvest it whenever it suits his convenience. The total share of the landlord, which is entered in a statement called *behrí*, is appraised according to the market value of the grain, and is paid by the tenant either in grain or money according to the agreement made between them.

Customary allowances.

Whether the *dánábandi* or the *batái* system prevails, a number of allowances have to be made out of the grain before the landlord's and tenant's share is determined, the chief difference being that in the case of appraisement the amounts given in the form of allowances are calculated instead of being actually weighed. Thus, it is the custom for the various village officials and landlords' servants to receive 2½ seers of grain between them before the produce is divided between the landlord and tenant. The *gumáshta* or landlord's agent, the *patwárí* or village accountant, and the *goraít* or village messenger get 6 chittacks each, the *hatwá* or weighman gets four, the *ámín*, the *nawisinda*, the Kándu or village water-carrier and the Kumhár or village potter two each, while the *baráhil* or *gumáshta's* peon gets the lion's share with 10 chittacks.

Merits of the system.

There can be no doubt that the *bháoli* system is almost indispensable where the crops are very uncertain or cultivation is dependent upon large works of artificial irrigation. It is not too much to say that if the *bháoli* system were to be abolished, not only would no new *dhars* be constructed, but those existing would fall into disrepair. It is true that the land-owner now-a-days does not always do his duty in constructing and maintaining *dhars*, but he would do it still less if it were not that he shares in the produce of the land. On the other hand, the system has grave defects, not the least of which is that it engenders slovenly cultivation. The incentives to industry are not so strong as in the case of *nagdi* lands, for the tenant receiving only half of the produce, has not the same motives for exertion and will not devote his energies to improving the land. The result is that the *bháoli* lands are comparatively neglected, while the *nagdi* lands receive the cultivator's best care and labour, because here whatever surplus is left over after paying the rent is pure profit.

Moreover, under the *bháoli* system endless disputes are the rule, as the method of appraisement and division furnishes many opportunities for fraud and oppression. In a small estate, where the petty zamíndár can look after his own fields and see the crops divided or check the appraisement personally, the system is not

so open to objection. The small proprietor is often a resident of the village and therefore amenable to public opinion; he is so directly dependent on his tenants that he has to keep on good terms with them; and his income is so vitally affected by the adequacy of irrigation works that in his own interests he is bound to keep them up.

The defects of the system are more apparent in large estates, for if the method of *batái* is followed, the opportunities for fraud are very great, and if the *dánábandi*, both landlords and tenants are at the mercy of the underlings whom the former have to maintain. If the *gumáshtas* side with the ryots, it is easy for them to cheat the proprietor; if they are not on good terms with the ryots, they can overestimate the produce, and they can always bring pressure to bear by neglecting to appraise until the crops are ruined by the delay. The result is that the subordinates can enrich themselves at the expense of both parties, and the landlord is often forced to introduce a middleman in the shape of a lessee, as a preferable alternative to entertaining a large staff of servants, who are an expense to himself and a fruitful source of oppression to the tenants. Here again the estate suffers. The *thikádár* or lessee has no permanent interest in the property; he endeavours to squeeze out of it as much as he can during the period of his lease, and the tenants are oppressed. There is, however, a steady tendency on the part of cultivators to secure cash rents, the result being that disputes about *nagdi* and *bháoli* form a marked feature of the litigation between landlords and cultivators in this district.

Nagdi system.

The *nagdi* system is the system under which rents are paid in cash. Where this system obtains, there are 4 peculiar tenures called *hast-búd*, *hál-hásil*, *balkat* and *jaidádi*.

Nagdi tenures.

Under the *hast-búd* system, the rate of rent is fixed at a particular amount per *bigha*, but rent is actually realized only for so much of the area as bears crops at the time of harvest. Thus, supposing that a piece of land measuring one *bigha* is cultivated, but for some reason, such as inundation, destruction of the crop by insects, etc., the area actually under crops at the time of harvest is only 16 *kathás*, the rent of 4 *kathás* is remitted and the rent for 16 *kathás* only is demanded. The name is derived from the Persian *hast* (is) and *bud* (was), and means literally "the-is-and-was-tenure."

When land is held under the *hál hásil* tenure, which is a tenure somewhat rarely found, the rent to be paid is determined on the spot, after an inspection of the crops when they are ready for harvest, by a rough appraisement of the produce and its value,

very much in the same way as under the *dānābandi* system. Similarly under *balkat* tenures, which are also rare, the landlord's agents, accompanied by the tenant, inspect the crops when ready for harvest and fix a cash rent by estimating roughly the quantity of the produce they will yield and its value.

The *jaidādi* tenure is specially adopted in lands subject to inundation or lands of poor quality in which the crops are very uncertain. Under this system the full rent agreed upon is paid in every year in which any crop, however small, is grown, and no rent is taken in any year in which no crop is produced. Another tenure known as *paran pheri*, which occupies a position intermediate between the *nagdi* and *bhāoli* systems, is also found, but very rarely, in this district. Under this tenure paddy land held on the *bhāoli* system, which is suited to the growth of sugarcane or poppy, is settled at a specially high rate of rent for growing either of those crops. When the sugarcane or poppy is harvested, the land reverts to the *bhāoli* system and is sown with paddy.

Rates of rent.

The maximum, minimum and average rent of land per acre is shewn in the following tables. These statistics have been obtained from the settlement papers of certain scattered villages forming portions of Government estates; until there is a settlement of the whole district, it is not possible to give statistics for the entire area, but these figures may be taken as fairly representative.

Subdivision.	Maximum.	Minimum.	Average.
	Rs. A.	Rs. A.	Rs. A.
BANKIPORE—			
Dūāra	8 0	4 0	5 0
Inland	20 0	2 10	6 0
BARH—			
Dūāra	6 0	0 4	2 8
Inland	6 0	2 0	3 0
BIHAR	9 0	1 4	4 0
DINAPORE—			
Dūāra	7 0	0 8	3 0
Inland	10 0	0 8	5 0

For *dih* or *bhīth* land, where poppy, vegetables and other valuable crops can be grown, rent rates vary from Rs. 6 to Rs. 24 per acre, according to the situation of the land and its proximity to the market. In the Dinapore and Bankipore subdivisions Rs. 12 per acre may be taken as an average for such land, while in Bihār the average is about Rs. 10, and in Bārh Rs. 9 per acre.

The rent of *kewāl* land, growing rice and *rabi* crops, is very uniform in all parts of the district. In the Dinapore subdivision the average is Rs. 5 per acre, in the Bankipore and Bārh subdivisions it is Rs 4-8, and in Bihār it is Rs. 6 per acre. *Doras* land suitable for *bhadoi* and *rabi* crops averages Rs. 7-8 per acre in Dinapore, Rs. 5-8 in Bārh, and Rs 9 per acre in Bihār. The sandy loam known as *balsundri*, which produces inferior *bhadoi* and *rabi* crops, brings in an average rent of Rs. 2-8 to Rs. 3 per acre in all parts of the district. The rent of *diāra* lands varies greatly. The very best *diāra* land, on which there is a rich deposit of silt, will fetch Rs. 30 per acre; while the worst, where the soil is nearly all sand, goes down as low as 12 annas an acre.

Occupancy rights.

The rent of *diāra* land is higher than it would otherwise be owing to the fact that in many cases the tenants have no occupancy rights. In the case of other lands the cultivators usually possess occupancy rights, and are fully aware of the privileges which they are entitled to under the Tenancy Act. Most small landholders, however,—and with the almost infinitesimal subdivision of estates which has taken place, they are very numerous,—hold some quantity of *zirāt* or private land in which no right of occupancy can be acquired.

WAGES.

The wages paid for labour, whether skilled or unskilled, are far lower than in the east of the Province, but they shew a great advance on those prevailing in 1874. At that time the rates were reported to be four times what they were formerly, but even so they were low enough. Coolies or labourers were paid at the rate of 2 annas per diem, and agricultural day labourers earned one anna for a day's work, but were usually paid in grain, at the rate of 3 seers of paddy or *khesāri*, representing a money wage of an anna or a little more. Smiths got from 1 to 4 annas and carpenters from 2½ to 3 annas daily. At the present day the normal rate of wages in towns is, in the case of unskilled labour, 3½ annas per diem for a male adult cooly, 3 annas for a woman and 2½ annas for a boy; and in the case of skilled labour, 5 to 6 annas for a carpenter or mason, according to their skill, and 6 to 8 annas for a blacksmith.

Outside urban areas the wages of labour maintain much the same level from year to year; but fortunately wages in the villages are usually paid wholly or partly in kind. Even the village artisan receives grain for the services he renders; and the field-labourer generally gets at least some of his wage in one or other of the inferior grains, such as millets or coarse unhusked rice. The rates of the wages thus paid in kind vary in different localities, but the ordinary daily rates for agricultural

labour are reported to be 2 annas and 3 seers of *sattu* (grain flour) for a man, 1½ annas and a quarter of a seer of *sattu* for a woman, and 1 anna and the same quantity of *sattu* for a boy. For harvesting crops the usual rate of payment is one bundle out of every 21 bundles harvested, but in the case of maize 1 seer out of every 12 seers is given when the cobs are extracted and dried. This system is particularly suited to an agricultural country like Patna, as it has the advantage of being unaffected by any rise in the price of food-grains. Whatever the fluctuations in the price of these in the market, the labourer's wage remains the same.

Prices

The gradual rise in the wages of labour which has taken place, at least in urban areas, has not kept pace with the rise in the price of food-grains. In April 1781 even the finest kind of rice sold at 31 to 36 seers per rupee, while paddy could be got at 95 to 111 seers per rupee; the price of wheat ranged from 56 to 63 seers and of gram from 100 to 104 seers, according to their quality, while the best salt was sold at 16 seers per rupee. The extent to which prices have risen since that date will be sufficiently apparent from the marginal table which gives the average price (in seers per rupee) of these articles in the last fortnight of March in recent years. The cheapening of salt in the last quinquennium shewn is due to the reduction of the salt tax.

Years.	Common rice.	Wheat.	Gram.	Salt.
	S. Ch.	S. Ch.	S. Ch.	S. Ch.
1891–1895	16 2	15 2	21 2	10 7
1896–1900	14 13	13 13	19 12	10 6
1901–1905	13 15	13 6	20 4	11 1

As regards the prices of food-grains at different times of the year, prices are easy at the beginning of October when the *bhadoi* crop is well in the market, but they rise sharply by the end of the month, no doubt owing to exportation; by the end of November they are again easier with the incoming of the great *aghani* rice crop, and then rise with more or less regularity till the end of February. In the month of March relief comes with the ingathering of the *rabi* harvest, and prices fall till about the end of April or the middle of May, when a rise commences once more, which continues till the early *bhadoi* crops come in towards the end of July. These crops are so cheap and plentiful, that the general average then falls sharply till the end of September.

The harvesting of each of the three great crops naturally ushers in a distinct fluctuation in prices. Grain is, on the whole, cheapest in September, just after the *bhadoi* is in; not quite so cheap early in May, when the *rabi* has all been gathered home; and less cheap at the end of November, when the rice reaches the market. Conversely, grain is dearest just before each of these three harvests is reaped, *i.e.*, in October, February and July. It might have been thought that as rice is the largest and most important crop in the district, its advent would have had the greatest effect on the prices of food; but it must be remembered that owing to the demand for exportation rice is never a very cheap grain. The same consideration holds good in a less and still lesser degree as regards the *rabi* and the *bhadoi*, for this latter crop (except maize) is but little exported; in other words, and speaking generally, the influence of each crop on prices varies inversely with the demand upon it for exportation.

Famine prices.

It is of some interest to compare the present prices of food-grains with those obtaining in former periods of scarcity. In 1866, the year of the Orissa famine, when Patna was slightly affected, the maximum price of common rice was 11 seers 8 chittacks per rupee, of wheat 7 seers 4 chittacks, and of maize 12 seers 4 chittacks per rupee. In May 1874, at the height of the famine, rice sold at 12 seers per rupee, wheat at 15 seers 10 chittacks, and maize at 18 seers 8 chittacks per rupee. In the famine of 1897 the highest price of common rice was 7 seers 12 chittacks in July 1897.

MATERIAL CONDITION OF THE PEOPLE.

Though the prices of grain have risen so enormously within the last century, there has been a very great growth in the income of all classes, and in the staying power of the peasantry during hard times, while the development of communications has had the effect of levelling prices over larger and larger areas. The loss of one or even two crops of the year has, therefore, a tendency to become less and less felt, as well as the effect of failures in isolated tracts. The cultivators have, moreover, learnt not only how wide a market they can find for their surplus produce, but that grain once sent out of the country comes back at an enhanced price, and that it is therefore necessary to lay by enough to provide against a possible failure of the crops and to sell when prices harden. They consequently keep large stores of grain, and are thus, to a certain extent, protected from the distress consequent on scarcity and the rising price of food. Besides this, the vast majority of labour is of an agricultural character and is paid in kind, and immemorial custom has fixed

the amount thereof, so that the high prices of grain affect a large section of the community less than would otherwise be the case.

As regards the resources of the people, no definite statistical information of a very recent date is available, but in 1888 a minute investigation was made as to the circumstances of an agricultural population of 2,708 living on the produce of 5,427 acres. The average area of each holding was found to be 5 acres, but 263 of those who formed the subject matter of this enquiry, or 23 per cent. of the whole number, represented families with less than 2½ acres, who were obliged to supplement their livelihood by working for others, and 460 or 17 per cent. were landless labourers. According to these statistics, about 60 per cent. of the agricultural population cultivate 5 acres and upwards, and gain a fairly comfortable living; while 23 per cent. have to reduce their scale of living during the interval, from March to September, between the cold weather and *bhadoi* harvest. As regards the landless labourers, their number is comparatively small, the demand for labour exceeds the supply, and they have begun to travel far and wide in search of employment. As a rule, it may be said that their earnings are sufficient to give them a full allowance of cheap food, clothing and a hut to cover them. But with a people so dependent on the soil a better insight into their material condition is obtained by seeing how they withstand scarcity; and it is very noticeable that Patna is practically immune from any general famine. Even in the famine of 1897, when other parts of Bihār suffered severely, there was no distress in Patna, and no relief works had to be opened.

Landlords.

In the district generally there are few great landlords with extensive estates and large rent rolls. The great majority are petty proprietors, and as a class they are losing status from the minute subdivision of property. A large number are impoverished, and this naturally reacts on their tenants, to whom they are often oppressive, as they can only maintain their position by exacting as much rent as they can.

Traders.

The commercial classes are rising as the landlords fall, and are thriving as no other section of the community thrives. To a considerable business aptitude they add a great penuriousness; and their wealth is increased by the way in which they combine to keep up prices. The railways have given a powerful stimulus to trade, and granaries bursting with grain are rising near every station.

Cultivating classes.

The cultivators are, on the whole, fairly well-to-do as compared with cultivators in other parts of Bihār. Their holdings are

generally sufficient for their maintenance, as will be apparent from the marginal table, which gives the average area held in different parts of the district, according to the settlement papers of certain scattered villages. Statistics for the whole district are not available, but these figures may be taken as fairly representative. They show that holdings are smallest in the Bihār subdivision, but there the greater part of the land is held on the *bhāoli* or produce-rent system, under which there is no enhancement of rents, as the proportion of the produce taken by the landlord does not alter.

Subdivision.	Inland area.	*Diāra* area.
	Acres.	Acres.
Bankipore ...	2·92	13·04
Bārh ...	4·76	11·47
Bihār ...	1·47	...
Dinapore ...	3·24	7·30

The most prosperous cultivators are those in the neighbourhood of Bankipore, Patna and Dinapore. A large cultivating class live on the outskirts of these towns and make a comfortable living by raising garden produce, including large quantities of potatoes, onions, garlic, cauliflowers and other vegetables, which are exported in large quantities to Calcutta and other parts of Bengal. This class are generally well-to-do, and have little fear of loss either from drought or inundation. Elsewhere the cultivators have a resource unknown to the ryots in Bengal proper in the cultivation of poppy, which plays an important part in the rural economy. Those who undertake to grow it receive allowances in cash proportionate to the area which they undertake to plant; these advances are made at a time when money is most coveted; and large sums thus find their way into the hands of the people. In 1896-97 nearly 8½ lakhs were paid to the cultivators; and though the area under poppy has shrunk of late years, over 4¼ lakhs were paid as advances in 1905-06 in the Patna sub-agency alone. On the other hand, there is a minority of cultivators with small holdings, a small "submerged tenth," who are forced to eke out their living by labour and are, in fact, but little superior to the ordinary labourers. They can generally just make ends meet, but are often pinched for food and can only command two full meals a day during a portion of the year.

INDEBTEDNESS.

Indebtedness is fairly general among the cultivating classes, but in the absence of details as to its nature and amount, it is scarcely possible to state that it represents any great degree of poverty. Agriculture, like other industries, is supported on credit, and the *mahājan* is as essential to the village as the ploughman.

Some of the ryots' debt is owed to the shopkeeper who sells grain, or to the *mahájan* or landlord for advances to purchase food while the harvest is ripening, and such accounts are usually closed when the harvest is reaped; some is contracted, more particularly if the harvest promises to be a bumper one, for expenditure on marriages in the family; and some debts are business transactions closely connected with agriculture, *e.g.*, for the purchase of seed, plough or cattle, or for extending cultivation or making agricultural improvements.

Labouring classes.

As regards the labouring classes, the village artizans form an essential part of the village community, are partly paid for their work in kind, and are thus indirectly supported by agriculture. In the towns there is a great demand for labour, and cases of acute poverty are rarely met with among the labouring classes. They are, moreover, frugal to a degree, choosing, it is said, to eat only one meal of *sattu* in the middle of the day in order to be able to invest their savings in jewels and ornaments. In the interior the lot of the landless unskilled labourers is a hard one, especially as they are recklessly improvident. Spending what they can earn from day to day, they have very little to pawn or sell, and they are the first to feel the pinch of scarcity when any failure of the crops occurs. On the other hand, large numbers of labourers migrate year after year at the beginning of the cold season, for temporary employment on roads, tanks and railways, in the harvest field, and in other miscellaneous employments, returning again at the end of the hot weather in time for the agricultural operations which commence with the bursting of the monsoon.

Many thousands of the adult males are also found spread over other parts of India in quasi-permanent employ, and all these persons make remittances to their homes; while those who migrate for a time bring back with them the balance of their savings. In this way, large sums of money are sent or brought into the district every year, and are expended in the support of the labourers' families.

Kamiyás.

At the bottom of the social scale, there is a small and diminishing section of the community known as *kamiyás*, whose position is that of mere serfs. A *kamiyá* usually sells himself to a master for a lump sum of money down. Formerly this was an actual sale of himself and his heirs for ever, but this practice having been declared illegal, he now hires himself, in consideration of an advance or loan, to serve for 100 years or till the money is repaid. *Kamiyás* are not allowed to work for anyone but their master, except with his permission, and have their food supplied

by him. On the whole, their position is in many ways little, if at all, worse than that of the free labourers (*banihārs*); though they are degraded beneath the level of the peasant, they are never in want of food even in lean years; and in this respect they are better off than the ordinary labourer, who is the first to feel the pinch of scarcity when any failure of the crops causes a cessation of the demand for labour.

In conclusion, the following remarks of Mr. C. J. Stevenson-Moore, Collector of Patna in 1893, may be quoted:—"There is still a large class of people who hold no land, grow no crops, and have no ambition for prosperity. They are not accustomed to regular and continued labour, and they are accordingly the most recklessly improvident people in India. Marrying whenever they like, and taking no thought for the morrow, the poverty of Musahars and Doms leaves them still addicted to crimes against property. On the other hand, the condition of tenants has considerably improved, and the peasantry are now beginning to defend their rights and occasionally to defy the zamīndār, while the artizans and trading classes have decidedly improved their condition, and have probably derived the greatest benefit of all from a strong and orderly Government."

CHAPTER X.

OCCUPATIONS, MANUFACTURES AND TRADE.

Occupations.

As in other parts of the Province, the majority of the people are dependent on agriculture for their livelihood, altogether 62·3 per cent. of the population being engaged in agricultural pursuits; this, however, is the lowest proportion in South Bihār. Of the total number dependent on agriculture 41 per cent. are actual workers, including 269,000 rent-payers, 105,000 field labourers and 14,000 rent-receivers. The Kurmis and Koiris, who number 181,000 and 80,000 respectively, are the principal agricultural castes; but the large castes of Ahīrs and Bābhans are also mainly cultivators, though the former are also usually herdsmen, and the latter petty land-holders. Besides those supported by agriculture, there are 27,000 persons, with 38,750 dependents, classed as vegetable providers, *i.e.*, the market gardeners of the district, who make large profits by growing vegetables on the rich land in the vicinity of village homesteads. The agricultural labouring class is chiefly composed of the lower castes, such as Dosādhs, Chamārs and Musahars.

Industries support 17·1 per cent. of the population, a proportion higher than in any other district in Bihār except Shāhābād (17·7 per cent.). This is in all probability due to the fact that Patna contains a large urban population, but apart from this, it is noticeable that the industrial population is far larger in the districts south of the Ganges than it is in those lying north of that river. It has been suggested that the reason for this predominance of artisans is that, after the murder of Alamgīr II and the fall of Delhi in 1759, many members of the Muhammadan nobility retired to their *jāgīrs* in Patna, Gayā and Shāhābād, bringing with them large numbers of artificers, while the districts to the north of the Ganges were still in an unsettled state, sparsely populated, and only partially cultivated. Of the industrial population in this district 41 per cent. are actual workers, among whom are 5,000 cow-keepers, 9,000 oil-pressers and sellers, 7,000 grocers, 6,000 toddy sellers, 3,000 masons, 8,000 cotton weavers, 4,000 tailors, 3,000 goldsmiths, 5,000 carpenters,

and 4,000 shoe-makers, as well as numerous grain and pulse dealers, grain parchers, tobacco sellers, thatchers, and basket and mat-makers.

Next in importance come the professional classes, who account for 2·4 per cent. of the population; 43 per cent. of these are actual workers, including 6,000 priests. The number of those supported by commerce is the highest in Bihār, but even so they represent only 1·2 per cent. of the population. Among those engaged in other occupations are 48,000 general labourers and 8,000 earth-workers.

MANUFACTURES.

Opium manufacture.

The manufacture of opium is by far the most important industry in the district. The first process consists of the manufacture of what is known as "leaf", which begins when the poppy plants flower in January and February. As soon as the flowers mature, the petals are collected and placed in an earthenware plate over a slow fire covered by a damp cloth. They are then pressed by means of a cloth pad, until the steam, acting upon the resinous matter contained in the petals, causes them to adhere together and form a thin round cake varying from 6 to 12 inches in diameter. In the case of leaves of the highest quality, which are called *chāndi*, the thick portion by which they are attached to the capsules is usually cut off. The leaves are delivered to the officers of the Opium Department, and are paid for according to quality. After delivery, they are sent to the Factory at Patna, where they are used in making the outer shell or envelope of the opium balls. The dried leaves and thinner portions of the stalks of the poppy plants, broken up fine, form what is known as "trash," which is used, after being thoroughly sifted and cleaned, for packing the balls of provision opium for exportation, and also for affixing to the cake. A small portion is hand sifted and reduced to a fine powder, like saw-dust, which is used for dusting the cakes immediately after manufacture, to prevent them sticking to the earthenware cups in which they are stored.

After the petals have been taken off and the capsules allowed to ripen, they are ready for the extraction of the juice. The capsules are lanced vertically in the afternoon, at intervals of 3 or 4 days, with an instrument composed of three or four sharp iron blades tied together, the incisions being sufficiently deep to let the juice flow freely from the shell of the capsule, without breaking through its inner wall into the receptable for seed. The juice is then allowed to exude and coagulate on the capsule until the next morning, when it is scraped off. The scrapings are collected in shallow brass or earthen vessels and tilted up so as to allow

the draining off of a black shiny substance, called *pasewā*, which is formed under certain atmospheric conditions. This *pasewā* is separately collected and taken over from the cultivators by the Department. On the care with which the *pasewā* is separated from the drug depends, to a great extent, the purity of the opium delivered. The drug is periodically turned over and manipulated until the time fixed for its weighment, which takes place usually about the middle of April, when the cultivators are summoned in regular order to certain appointed weighing places, where the weighment of the opium is conducted under the direct supervision of gazetted officers of the Department.

The drug is classified according to its consistence by the officer in charge, who also examines it for adulteration. Should the opium be found to contain any foreign substance or be suspected of such, it is set aside for subsequent and more detailed examination by the Opium Examiner at the Factory; and on that officer's report, the opium is either confiscated or a deduction made from its value according to the degree of adulteration. Good opium is paid for on delivery at the rate of Rs. 6 per seer of 70 degrees consistence or more, *i.e.*, if it contains 70 per cent. or more of pure opium, and the price then given falls if the drug contains less than 70 per cent. of pure opium. After classification and weighment, the opium, if of low quality, is placed in earthen jars, but if more solid, *i.e.*, over 67 degrees consistence, it is put in stout drill bags, which are then sealed and despatched to the Factory.

The Opium Factory.

After the classification, weighment and despatch of the opium from the weighing stations, the scene of action is transferred to the Opium Factory, which is situated in the heart of the city of Patna, and occupies the site and some of the buildings of the old Dutch Factory. The officer in immediate charge of the factory is known as the Factory Superintendent, and he is assisted by a gazetted officer of the Opium Department, styled the Assistant Factory Superintendent. The subordinate staff consists of an Assistant Opium Examiner and seven assistants, including the store-keeper. Under these, again, are other temporary assistants, native *sardārs*, clerks and a large number of employés. On receipt of the opium at the Factory, the contents of each bag or jar are re-classified according to consistence, which is ascertained by hand tests and by drying samples on the steam tables. They are also tested, both by hand and chemical tests, for impurities and adulterations. When the degree of consistence has been ascertained, the accounts are made out, and previous to settlement each ryot is paid, either personally or through the *khattadār*, any

amount which may be due to him on account of any higher consistence of the opium as found by the Factory assay as compared with the mass originally fixed at the weighments. In the same way, any deficit due to fall in consistence discovered at the Factory is recovered from him. All opium declared after examination to be good is stored in large stone vats, each vat being marked to receive opium of a certain degree of consistence.

The manufacture of provision opium, *i.e.*, opium intended for exportation, usually begins about the end of April or the first week in May, and proceeds uninterruptedly until completion generally about the end of July. The standard fixed for Bihār opium is 75 degrees, but it is rarely possible to cake all the opium at that standard. As high a standard as possible is fixed, and the only manufacturing process that is necessary is to so mix opium of different consistences as to get the required standard consistence for the whole, a process which is technically known as "alligation." After the alligation has been completed, the opium is taken to the caking room and there weighed out, 1 seer 7½ chittacks being allowed for each cake or ball to be manufactured. If, owing to the low consistence of the drug, it is not possible to alligate at the recognized standard, a small additional allowance of opium per cake is made for each degree below 75 degrees. The shell or outer covering of the cake, which is composed of poppy leaves put together by means of a paste (known as *lewa*) made of opium and *pasewā* mixed with water, is manufactured in hemispherical brass moulds, and when finished it is a sphere about the size of a 24-lb. shot, the thickness of the shell being $\frac{7}{16}$ths of an inch. After manufacture, the cakes are dusted with fine trash, put in small earthen cups, and placed in the sun to dry. At the end of the day's work, they are brought back into the caking room and examined. They are again examined each morning, all faulty ones being separated, and then sent into the different godowns, where they are ranged on racks to mature. About the beginning of August another operation technically known as *sattai* commences. This consists of putting an additional layer of fine leaf round the shell to give it a finished appearance. The whole of the shell is then covered with trash, and this distinguishes the Patna cakes from those manufactured at Ghazipur, where only half the shell is thus treated.

The chests of opium manufactured for export are sold by auction in the office of the Board of Revenue by fixed instalments on fixed days. The packing of the opium cakes in chests for

despatch to Calcutta usually begins about the first week of November. Each chest contains 40 cakes of opium arranged in two layers of 20 each. The quantity of opium of standard consistence contained in a chest of provision opium is 1 maund 28 seers 4 chittacks, and this includes the opium used in the form of a paste for making up the shell of the cake. The cakes are kept apart from each other by thin compartments of wood, the upper and lower layers of cakes being separated by a mat. All the corners and crevices are well filled in with trash, which serves as a padding. When packing is once commenced, it is carried on continuously every week-day, except on rainy or damp days, at the rate of 500 chests daily. When a sufficient number of chests have been packed, they are despatched from the factory to Calcutta, where the chests are stored in godowns specially built for the purpose, until they are cleared for exportation. The chests used for packing the opium are manufactured by the Saw Mills at the Factory, which are in charge of an Engineer directly subordinate to the Factory Superintendent.

The opium prepared for local consumption in India is called excise or *abkāri* opium. The opium is dried by exposure to the sun until its consistence is raised to 90 degrees, owing to the evaporation of the moisture in the drug. It is then weighed into quantities of one seer or half a seer, which are pressed in moulds into square cakes. The cakes are wrapped in paper slightly oiled to prevent adhesion, and packed in boxes containing 60 each. Some of the chests so packed are then despatched to the opium godowns in Calcutta, whence all district and subdivisional treasuries in Burma and Assam are supplied, and the remainder are sent direct from the Patna Factory to the different districts in Bengal and Bihār.

Opium intended for medical purposes is also manufactured at the Factory; it is prepared from opium specially selected from the season's supply on account of its excellence in colour, aroma and texture.

Distilleries.

The distillation of spirits ranks next in importance among industries in which machinery is employed. The outstill system prevails in the Patna district, with the exception of the area served by the Sādr distillery, which consists of Patna city, Bankipore, Dinapore, Phulwāri and Digha, and the country comprised between them. The outstills are of the ordinary old-fashioned type and call for no description. The Patna distillery has 18 stills, of which one is a steam still, the rest being stills of the French pattern. They vary in capacity from 175 to 615 gallons, and there are 1,537 fermenting vats with an average capacity

of 18 gallons each. The ingredients used are *mahuā* and *gūr*, and the monthly outturn is about 9,000 London proof gallons of spirit.

Mills. The only other large industry is the Mālsālāmi oil and flour mill in Patna city employing 55 operatives. Oil mills are fairly common in the larger towns of the district, but as a rule they are on a very small scale.

Factories. There are no factories in the ordinary sense of the word, the only two concerns which are officially classed as such being the workshops of the Bihār School of Engineering and the saw mills of the Patna Opium Factory. The former have been established for the purpose of teaching the students practical engineering, and the latter are chiefly employed in making chests for packing opium. Some foundries are at work in Bankipore, south of the railway station, and at Dinapore, and a large factory for the manufacture of ice and aerated-water has been erected at the former place.

Mines. There are no mines at work in the district. Formerly a small gold mine was worked at Kaliānpur 3 miles from Rājgīr, but the work done was merely of a prospecting nature, a few tons of quartz being taken out of different pits and tested, and there were no real mining operations resulting in a definite output. The mine was abandoned, after a very short existence, in 1892.

Hand industries. Nowhere is the decline of Patna as a manufacturing centre more noticeable than in the matter of hand industries. Practically every kind of industry is carried on, but none of them are of special importance or extent; and with the exception of the linen, furniture and cabinetware of Dinapore, few of the local products are exported. Carpets, brocades, embroidery, pottery, brasswork, toys, fireworks, lac ornaments, gold and silver wire and leaf, glass-ware, boots and shoes and cabinets are made in Patna city, carpets in Sultānganj, Pīrbahor and Chauk, and embroidery and brocade work in the Chauk and Khwāja Kalān thānas. Durable furniture and cabinets are made at Dinapore. The manufactures of the Bārh subdivision consist of jessamine oil (*chameli*), coarse cloth, and brass and bell-metal utensils, and those of the Bihār subdivision are soap, silk fabrics, tubes for hookahs, muslin, cotton cloth, and brass and iron ware. The more important and interesting of these industries are described below.

Weaving. Weaving was formerly the great industry of the district, but it is now declining owing to the competition of cheap European piece-goods. Cotton weaving is still, however, carried on to a

small extent in nearly every village, and on a larger scale in the city of Patna and in the towns of Bihār and Dinapore. The chief article manufactured is a coarse cotton cloth called *motiā* or *gāzi*, which is chiefly used by the poorer classes in the cold weather. It is warm and durable, and is used for making *dhotis*, jackets, wrappers and quilts for men, and for *sāris* and bodices for women. The cloth is popular among the poorer classes, who cannot afford to purchase woollen fabrics for the winter. Blanket weaving is also carried on to a limited extent by Gareris, especially in the Masaurhī thāna. Towels, bed-sheets, table cloths and napkins of a superior kind are manufactured at Dinapore; at Bihār good muslin, like the well known Dacca muslin, is produced; and *aswār* tape is made in Patna city.

Carpet making is practically confined to the latter place, which is described in the Monograph on Carpet-weaving in Bengal (1907) as "the great seat of *dari* manufacture in Bihār." Here a large number of the cotton floor cloths called *daris* and *satranjis* are woven in Sultānganj, Alamganj and Pīrbahor; and cotton *dulichas* and woollen *āsans* in the two thānas first named. A small quantity of the coarse carpets called *kālins* are sold to wholesale dealers and exported to Calcutta; and woollen carpets of a better kind are made on a small scale in Sultānganj, Pīrbahor and Chauk.

Silk weaving is now almost confined to the Bihār subdivision, where it is reported that about 200 looms are at work. The weavers produce tusser silk fabrics, which obtain a local sale and are also exported to Calcutta, but they mostly turn out cotton cloth and cloth, called *bāfta*, composed of a mixture of cotton and silk. In Fatwā thāna in the Bārh subdivision there were till comparatively recent times over 1,000 looms engaged in cotton and silk weaving, but the industry has declined and the number of weavers has largely decreased; the only place where silk is now woven to any extent is Raipura (Fatwā).

Glass-ware.

Patna city is almost the only place in Bengal where glass is made. A large number of bottles for holding scent, lamps and bangles are made out of Son sand mixed with soda (*kharī*). The glass produced is, as a rule, green and impure, but some pure white glass vessels are made from broken railway lamp glass; ordinary English glass assumes, it is said, a milky colour when remelted. Vases of European design in coloured glass are also made, the workmen colouring the glass with sulphate of copper, indigo, blue and other ingredients, while blue glass is made by adding an oxide of tin. The process of melting is very simple. A furnace with a blast is prepared, and over this is the annealing

chamber; the broken glass is fixed on a blow pipe or metal rod; and having been melted or softened, is blown or pressed into the desired shape. The Lodi Katrā quarter is the centre of the industry.

Cabinet ware.

Patna and Dinapore are celebrated for their skilled carpenters, whose dexterity is attested by the handsome carved balconies found in these towns. A large quantity of European furniture and other cabinet work of good quality is made in the workshops of 2 firms at Dinapore and exported to other places. Dog-carts and *pālkis* are also made in the same two towns under European supervision, and find a ready sale among native gentlemen.

Embroidery.

Gold and silver embroidery and brocade work are carried on in the Chauk and Khwāja Kalān thānas in Patna city, where there are about 1,000 men employed in this industry, and also to a limited extent in Bihār town. The embroidery, which is of two kinds, known as *kāmdani* and *zardozi*, is chiefly applied to caps and to the trappings of horses and elephants; it has not the reputation of Lucknow or Benāres work. The gold and silver wire and leaf used are made locally, but most of the gold thread comes from Benāres and the United Provinces.

Jessamine oil.

The manufacture of jessamine oil at Bārh is an interesting old industry, which is now almost defunct. The men engaged in the industry, who are called *gandhis*, are mostly Rājputs by caste, but there are also a few Muhammadans. There are still ten or twelve families of them at Bārh, where they grow about 25 *bighas* of jessamine. The oil is made from *til* seed, which is kept wrapped in a cloth with jessamine flowers after the husk has been removed. The quality of the oil depends upon the number of times the sesamum is impregnated with jessamine before the oil is extracted. When the quantity of flowers used is 12 times that of the sesamum, the oil is called *bāragunā* and sells at Rs. 12 a seer; when it is six times, it is called *chhagunā* and sells at Rs. 5 or 6 per seer; and when it is three times, it is called *tingunā* and sells at Rs. 2 to 3 per seer. Five seers of sesamum produce about two seers of oil.

Stone-carving.

Stone-cutting is carried on by four firms in Mārufganj Ghāt in Patna city. The stone used is chiefly sandstone (locally known as Mirzāpurī stone), which is brought down by river in rough-hewn slabs from Bindhāchal and Chunār, in the Mirzāpur district. Granite is also imported from Sasarām and Monghyr, but in very much smaller quantities; this stone is harder and the *sils* (*i.e.* slabs for grinding curry) and *jāntās* (hand-mills) made of it are sold at higher prices. The articles principally made are figures of Hindu gods, very roughly shaped, varying in price from

4 annas to Rs. 5 each; curry-stones (*sils*) varying in price from 4 annas to Rs. 2 each; hand-grinding stones (*jantā*) from 8 annas to Rs. 2 each pair; pestles (*lorhā*), potter's wheels (*chakki*), and stone plates and cups. There is a constant demand for these articles from all parts of Patna, and they are also supplied to other districts.

There is very little lapidary's work carried on in the city of Patna or in its vicinity, with the exception of carving small pieces of crystal or pebbles (imported principally from the hills of Monghyr and Bhāgalpur) and polishing them into small stones, called *nagīnas*, for setting in rings, necklaces, amulets, etc. Some business is also done in carving phylacteries of hexagonal shape, with appropriate verses from the Korān inscribed on them, to serve as charms against disease, especially palpitation of the heart. These are principally used by Musalmāns and low caste Hindus, who prize them as preventives against attacks of disease, the "evil eye" and other similar influences. In Patna the *hakkāks* or lapidaries are all Musalmāns, who have followed the trade for generations past. There are also a few families of these lapidaries in Bihār and in Bindidih, a small village 15 miles to the south of Bihār; but in every case these men have some other trade to supplement their work in stone, as alone it is not sufficiently remunerative to support them.

Wood-carving.

Regarding the wood-carving industry, the following remarks may be quoted from "A Monograph on Wood-Carving in Bengal" by Chevalier O. Ghilardi:—"The existence of wood-carving at the present day is practically nominal. Judging, however, from the remains of the older wood-carvings in that interminable line of houses extending from Bankipore to Patna, it is clear that much better work was produced in the past, when this industry appears to have enjoyed a period of happy florid forms, with which the work done at present cannot bear comparison. It would appear that all the old carving visible along the road was cast more or less from the same mould, so little is the variety in form and design; still we can observe a special characteristic in each group of carvings, which distinguishes it from those of the other villages. The carving to which I allude is that in connection with the buildings, such as the pillars, architraves and brackets supporting their verandahs and roofs. Unfortunately, nowadays, the taste of the inhabitants has changed. When a house is near to fall in pieces, and it is rebuilt, no more carved pillars are used; bricks are the only substitute. Originally, most of those pillars were first worked by the turner, even those with large diameters, and afterwards carved by clever artisans. The wood used here is